Pe. B. FY1

Draft Outline – for Discussion

Bicycle Plan for the MAPC Region

MAPC's 1997 *Regional Bicycle & Pedestrian Plan* has been in effect for eight years. MAPC intends to update this plan to reflect subsequent changes in project status, land use, demographics, and funding. The updated plan is anticipated to contain at least the following elements:

1. *Introduction*

1.1. Plan scope and purpose

- Discuss status of implementation of previous plan's recommendations (and what has been learned from these successes and failures).

1.2. Legislative and planning context

1.3. Policy Framework: MetroPlan/MetroFuture

- National, Commonwealth, local context and efforts

1.4. Public Participation

1.5. Benefits of bicycling and bicycling facilities

- Discussion of "public health" sector efforts in recent years
- Bicycling's role in Transportation-Land Use connection: Smart Growth and Sustainability

2. *Goals, Objectives*

2.1. On-Road Improvements

2.2. Off-Road Improvements

3. *Regional System: Existing Conditions*

3.1. Bicycle travel in the region: frequency, demographic, and trip characteristics

3.2. Bicyclist user types: FHWA terminology A, B, and C

3.3. Types of facilities; preferred facility types

- Including: shared lane, wide curb lane, usable shoulder, bike lane
- Matching users and trips

Draft Outline – for discussion

3.4. Existing and proposed facilities

- Using updated map and database to match travel patterns and user types with existing facilities

3.5. Existing and proposed regulatory components

3.6. Existing and proposed organizational resources

3.7. Opportunities for improvement to the current systems

4. *Improving the Regional Bicycle System*

4.1. Identifying regional priorities

- Including TIP criteria, MAPC Smart Growth principles
- Ensuring conformance with Commonwealth policies and programs

4.2. Identifying and evaluating regional priority projects

- On-Road Facility Prioritization process
- Off-Road Facility Prioritization process

* See attached Matrix for these On- and Off-Road Facility Criteria

5. *Recommended Strategies and Implementation*

5.1. Facility planning, development, and maintenance

5.2. Education and encouragement

5.3. Involvement and Influence: Key Tasks

- Local Level:
  - Develop bicycle accommodations check-list for municipal use during project development review
  - Research and develop recommended changes to zoning (consulting, among other resources, *Statewide Bicycle Transportation Plan*)
- Regional:
  - Continue dedication to addressing bike issues with MEPA review
  - Encouragement/Education through web – On-line interactive trail status map
  - Continue involvement in Legislative Bike/Ped Caucus
  - Participate in Statewide Conference
  - Provide annual updates to sub-regions
  - Continue to participate in MBTA Bike Committee

    - Promote Safe Routes to School efforts
- State:
    - Active involvement with Statewide bicycle plan update
    - Fully participate in statewide Bike/Ped Advisory Board (EOT)
    - Appropriately influence re-write of MassHighway design manual to further plan objectives, including lane edge stripe (fog line) and other on-road facilities discussed earlier
    - Coordination with MassBike and other bicycling interest groups

5.4. Enforcement Efforts at the State and Local Levels

5.5. Funding

- Direct regional funding influence held by MAPC – commitment to priorities identified in this plan
- Research potential funding sources and disseminate to local communities

Bibliography and Works Cited

The proposed plan content is based on a variety of sources. Specifically, the current bicycle plans of MAPC and The Commonwealth of Massachusetts are important foundations. Other bicycle plans were analyzed, including plans for Portland, OR; Maricopa County, AZ; Metropolitan Transportation Commission, CA; Toronto, ON; Madison/Dane County, WI; Pioneer Valley Planning Commission, MA; State of Wisconsin; State of Florida.

On-Road Bicycle Accommodation in the Greater Boston Region: Possible Treatments

There is general agreement at the local, regional, and Commonwealth levels that increased bicycling will result in improved public health and reduced automobile use. While this agreement continues to strengthen, there is still a considerable amount of work to be done in order to create a bicycle-friendly environment. Public discussion continues on what types of facilities should be planned and built, and how they should be financed and maintained.

Bicycle facilities are typically divided into two types: on-road and off-road. The most visible (and perhaps the most popular) are off-road paths. While they are often celebrated and well-used, their absolute number is low and they are relatively expensive to construct and maintain. Dedicated off-road bicycle paths are important and desirable elements of a comprehensive regional bicycle facility network, but they do not always provide bicyclists with direct access to particular origins and destinations. However, on-road bicycle facilities are equally important because they serve a majority of origins and destinations. The existing infrastructure of public streets and roads must serve all members of the public, and that includes bicyclists.

There are several types of on-road bicycle facilities, each of which differs in terms of costs, benefits, and appropriateness. The FHWA, in its 1994 *Selecting Roadway Design Treatments to Accommodate Bicycles*, categorizes these facilities as follows:

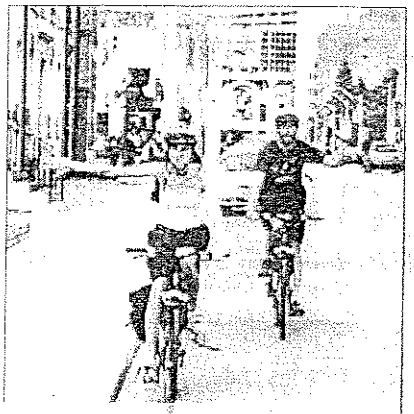


Photo: City of Toronto

Bike Lane

By definition, a bike lane is a portion of the roadway designated by striping, signing, and/or pavement markings for preferential or exclusive use of bicycles. Designated for the exclusive use of cyclists, they can increase predictability and safety. Generally, bike lanes should be 5' wide. With high volumes and speeds, 6' is appropriate. The minimum lane widths are 4' next to curb and 5' next to parking. The minimum dimension of parking plus bike lane is 12' (preferably greater). Where space is available, wider parking lanes should be implemented. The bicycle lane pictured below changes from being located between on-street parking and through lanes to being immediately next to the curb.

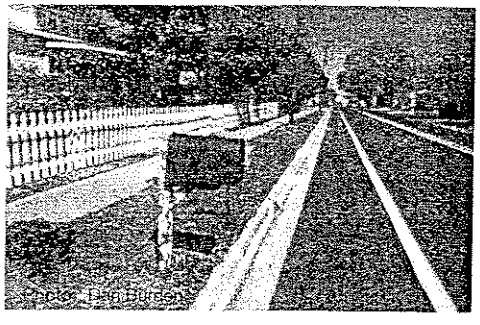


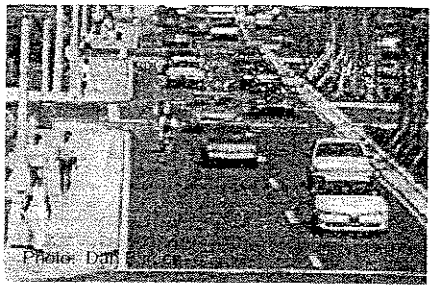
Photo: Dan Burden

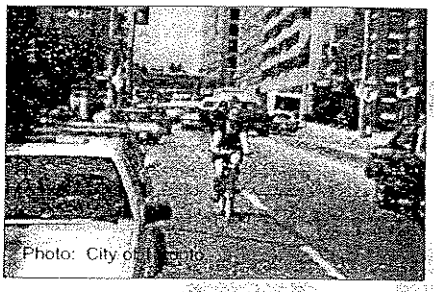
Usable Shoulder

A usable shoulder is a paved portion of the roadway to the right of the lane edge stripe designed to serve multiple purposes, including bicycling. Where sufficient travel lane width exists, a usable shoulder may be created by shifting the lane edge stripe toward the centerline. By decreasing the width of the travel lane, several benefits may be achieved, including more operating space for bicyclists, prompting greater adherence to lane markings by motor vehicles. Usable shoulders can be gradually implemented as part of standard operating procedure, and may be applied to a wide variety of roads types.

Recommended widths for usable shoulders vary depending on average daily traffic volume, percentage of trucks, and average traffic speed, among other factors. A general approach that can be almost universally applied recommends that the inside travel lane be striped at 10' or 11' wide (or less, where appropriate) with the remaining roadway width becoming a usable shoulder. While it is desirable to have paved shoulders of at least 4', any additional shoulder width is better than none at all, especially for experienced bicyclists. Shoulders that are less than AASHTO recommended dimensions are not usually marked as bicycle facilities, though they essentially function as such. On rural roads, rumble strips can create hazardous conditions for cyclists.

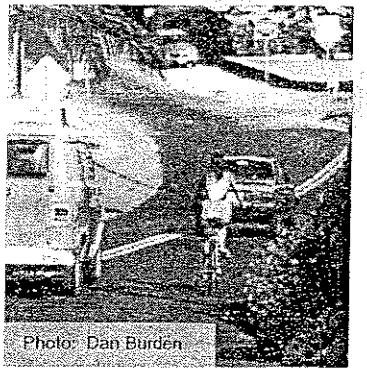
Usable shoulders should be designed in a consistent manner and smoothly paved, and free of parallel drainage grates and abrupt grade changes. Shoulders must also be kept clear of debris and encroaching vegetation.





Wide Curb Lane

Where limited right-of-way does not permit the creation of a bike lane or shoulder, wide outside lanes are better than nothing. The image below shows an instance where a very sizable outside lane accommodates both cars and bicycles. Wide curb lanes are recommended to have a width of 13', or next to parking, 14'-15'. It is important to note that at 14' lane width, one could stripe a 10' lane and 4' bike lane (against parking, 5' is needed for the bike lane). A potential drawback of a wide curb land is that it may encourage motor vehicles to occupy the entire lane width. Another instance of a wide curb lane is displayed in the photograph to the left. It is essentially a wide parking lane next to a slightly narrower travel lane. This provides some space for cyclists. Often in situations like this one, the lanes can be restriped to insert a bicycle lane. Alternately, another way to highlight the bicycle in this circumstance is to use a "shared lane pavement marking." This shows motorists the approximate location of bicycle travel without limiting bicyclists to a certain part of the roadway.



Shared Lane

A shared lane is essentially a "standard" sized lane (10'-12') that accommodates both motor vehicles and bicycles. Shared lanes work best in environments such as quiet urban residential neighborhoods or on low-volume rural roads. Some streets may work well as a shared use environment if traffic calming is used to ensure appropriate speeds and driver behavior. If implemented on higher volume and higher speed roads, only experienced adult bicyclists would likely be attracted.

If you have an interest in further exploring ways to facilitate bicycling in your community, please contact the Metropolitan Area Planning Council for information.

DRAFT - Bicycle Facility Cost Comparison: Representative Examples

	Shoulder Construction		Separate Bikeway Construction		On Road Bicyle Lane Marking		Bike Lane, Pavement Extension		Pavement Striping		Signs, including posts	
	per sq ft	per mile	per sq ft	per mile	per sq ft	per mile	per sq ft	per mile	linear ft	per mile	each	per mile
ITE (1997). *A Toolbox for Alleviating Traffic Congestion and Enhancing Mobility*, p 105	$3.86	$102,000, 5'	$6.50	$340,000, 10'					$0.12	$633.60	$200.00	
Needham (2000). *A Bicycling Plan for the Town of Needham*						$10,500, both sides			$0.50	$2,640.00	$125.00	$62.50-$125.00
Florida DOT (1999)		$102,000, 5' both sides, rural		$128,000, 12', railroad conversion				$189,000, 5' both sides				
Virginia DOT (2000)		$60,200, 4' both sides		$92,000, 10'				$270,000 4' both sides, with curb and gutter	$0.60	$3,168.00		
Wisconsin DOT Bicycle Transportation Plan (using "marginal cost" approach -- costs over and above the costs of the project without bike accommodation)		$20,000, 3', $33,000, 5', both sides, on gravel		$200,000, 12'				$25,000-90,000, 5-6', both sides				
MassHighway (per Guy Rezendes MHD Engineering Department phone conversation on 8/18/04)		"Not Available"		$1,000,000 (in certain instances) 10'					$0.50	$2,640.00		$250
bicyclinginfo.org, walkinginfo.org						$5,000-50,000						

Note: Every project has unique cost characteristics. For each facility type and design element, lifespan and maintenance costs should also be considered.

DRAFT - Comparison of Recommended Dimensions for Bicycle Facilities

	Shared Lane	Wide Curb Lane	Shoulder	Bike Lane	Notes/Source
American Association of State Highway and Transportation Officials (AASHTO)	Wider than 12'	14' recommended, sometimes 15' preferred/necessary. With parking, min. 12' combined parking/bike travel lane	"Any additional shoulder width is better than none at all", recommended minimum is 4'; 5' from guardrail or curb; greater width for higher ADT/trucks	4' if no curb or gutter; 5' if adjacent to parking or curb or guardrail. 11' shared bike lane and parking area if no curb face, 12' if curb face	*Guide for the Development of Bicycle Facilities*, 1999
Federal Highway Administration (FHWA)	Only for group A cyclists: 12'.	14', up to 16' when higher ADT and speed (16' only for Group A cyclists)	Minimum 4', up to 8' when higher ADT and speed: 2' acceptable for A/experienced adult bicyclist	Minimum 5'; 6' when higher ADT and speed	*Selecting Roadway Design Treatments to Accommodate Bicycles*, 1994
MassHighway Building Better Bicycling (1999)	Travel Lane: Arterial=11.5'; Collector/Local=11'	Arterial=19.7'; Collector/Local=14.8'	Arterial=8'; Collector/Local=4'	Cites AASHTO guidance	*Building Better Bicycling* (1999) Lower speed and ADT=decreased widths (ie <1500 ADT, 30mph = 10' travel lane, 1.6' shoulder
MassHighway Design Subcommittee 5 (2004)	If <12', not considered "bicycle accommodation"; if used, should include improvements, ie, improved sewer grates, bridge access	14-15', where space for bike lane is insufficient	Ideal for rural roads, can work on urban and suburban roads; range from 2-5', 5' preferred	Minimum of 4' against curb, 5' against parking, 6' when traffic speed is >30mph; 15-16' lanes should be striped as bike lanes	Roads should be designed for "B" (less experienced adult) bicyclists
Pedestrian and Bicycling Information Center	11' shared bike lane and parking area if no curb face, 12' if curb face	14', 15' where extra space for maneuvering is needed (steep grades, along parked cars, other obstacles)	4' minimum; less is helpful but should not be marked as a facility; 5' if guardrail Widths should increase with higher bike usage, vehicle speeds >50mph, increased truck/bus traffic	4' if no curb or gutter; 5' if adjacent to parking or curb or guardrail.	bicyclinginfo.org
State of Vermont Agency of Transportation	Minimum 11'	12'-15'	At least 3' is preferred. Range is 1' to 10'	4'-6'	http://www.aot.state.vt.us/progdev/Documents/LTF/FinalPedestrianAndBicycleFacility/PedBikeTOC.html
Oregon DOT (BikePed Plan)	<25mph or <3000 ADT	>14', <16'	Recommended 6', range from 2' to 8'	Minimum 4', up to 6'	http://www.odot.state.or.us/techserv/bikewalk/planimag/toc-imag.htm

Definitions of Facility Types (Federal Highway Administration (FHWA), *Selecting Roadway Design Treatments to Accommodate Bicycles*)

Shared Lane: Shared motor vehicle/bicycle use of a "standard"-width travel lane

Wide Curb Lane: An outside travel lane with a width of at least 14'

Usable Shoulder: A paved portion of the roadway to the right of the edge stripe designed to serve bicyclists

Bike Lane: A portion of the roadway designated by striping, signing, and/or pavement markings for preferential or exclusive use of bicycles

Group A cyclist: Experienced, adult bicyclist

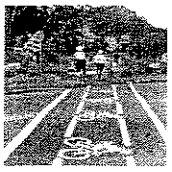
Group B cyclist: Less experienced adult bicyclist

Draft Criteria for Prioritizing Potential On-Road Bicycle Facilities
Background
Rubel Map - Identified as recommended route?
MetroWest 1996 Map
Existing Studies mentioning on-road facilities(including CTPS)
Local Support (past and current)
Municipal Commitment (bike-friendly provisions in site plan regs, Master Plan; i.e. require bicycle accommodation, mixed use zoning, road network with good connectivity)
Methodology developed in 1998 *Statewide Bicycle Transportation Plan* (check)
Physical Characteristics
Paved Shoulder Existing?
Travel Lane Width (>14')
On-Street Parking
Pavement Condition (Smoothness)
Bicycle-Safe Drains/Grates
Terrain (Hilly or Flat)
Sight Distance
Timing of Repaving (Local and State Roads)
Existence of Preferable Alternative Route?
Intersection Frequency and Characteristics
Utility/Usability
Connectivity to Existing Off-Road
Connectivity to Existing On-Road
Connectivity to Potential Off-Road
Connectivity to Potential On-Road
Proximity to Transit
Proximity to Other Generators and major destinations (including Retail Centers, Schools, Concentrated Employment Sites, Recreation Areas)
Density in Corridor
Journey to Work Mode Share of Bike/Walk
% of Residents that Live and Work in the Same Community (or alternately, Commute Length)
Traffic Operations
ADT
% Truck/Bus Traffic
Speed (Posted/Observed)
Bicycle or Pedestrian Crashes

Draft Criteria for Prioritizing Potential Off-Road Bicycle Facilities
Status Information
Proponent (if not town)
Existing or Under Construction
Previous Planning? (month/year)
Actively Planning? Completed?
Feasibility Study? (month/year)
Design Work Completed? (phase) (month/year)
Actively Designing? (phase)
Right of Way
Owner
Lease or Acquire?
Lease Terms Favorable?
Acquisition costs
ROW Horizon (0-2, 2-5, 5+ yrs)
Utility/Usability
Connects with Existing Segment?
Connection Between Two Existing Segments?
Part of a "Significant" Network?
Pop/Emp Density (Hi/ Med/Low)?
Number (and list) of Major Generators?
Use Projections - commute trips prioritized
Supports Sustainable Development/TOD
Municipal Commitment
Staff Actively Working on Project?
Contact Person(s)
$ Spent on Project?
Future Financial Commit?
Secured State or Fed Funds?
Private Funds?
Right-of-Way Criteria
Ownership (fee, location, easements)
Encroachments (if known)
Existing utilities -gas, water,sewer, electric
Potential/future utility accommodations and leveraging opportunities
Observed intersections w/public and private at-grade crossings
Known on-site or immediately adjacent environmental concerns
Known plans for other transportation uses in corridor (i.e. Urban Ring, haul roads, busways)

MAPC Regional Bicycle and Pedestrian Planning

www.mapc.org/whats_new.html



Minuteman Advisory Group on Interlocal Coordination (MAGIC) Subregion
May 12, 2005

Background

- Existing plan: MAPC Regional Bicycle and Pedestrian Plan (1997)
- MAPC is well suited to perform this update
- Timing is right: MA Highway Design Manual and Statewide Bicycle and Pedestrian Plans are being updated
- Workscope has been approved, work has begun; this is a two-year process

The Bicycle and Pedestrian Plan

- Goal: to facilitate and encourage bicycling and walking as convenient, safe, and practical forms of transportation in the MAPC region
- Focus: on outreach, connectivity, and results rather than the simple writing of a plan
- Strategy: to link on and off road facilities and emphasize that streets are for everyone

Outreach

- Municipalities
- MAPC Subregions
- MassHighway Association
- MassBike
- Other Massachusetts RPAs
- MassHighway District Offices
- Executive Office of Transportation
- Department of Conservation and Recreation
- Local Bike Committees, Planning & DPW staff, and others

MAPC's Efforts to Improve Regional Bicycle Accommodations

- Encourage and prioritize investments in off-road bicycle facilities
- Actively promote appropriate on-road bicycle accommodation to improve better connectivity and access

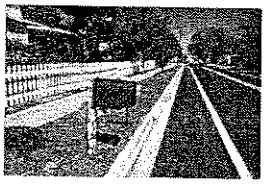
Off-Road Trails



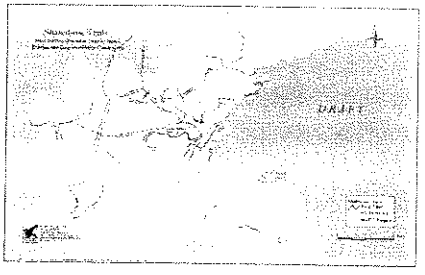

Types of On-Road Bicycle Accommodation

1. Bicycle Lane

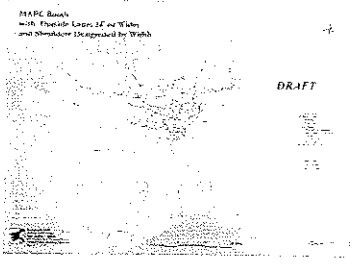
2. Usable Shoulder



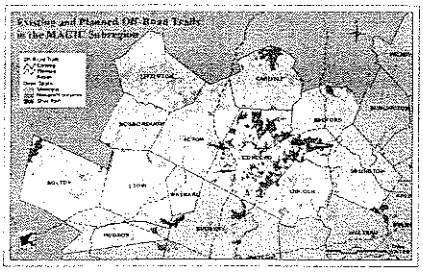
Regional Off-Road Trails



Potential Roadways for On-Road Bicycle Facilities



Mapping – Off-Road Rail Trails in MAGIC Subregion



Pictometry image of Assabet Rail Corridor, Hudson

Funding Resources

- Chapter 90 funds for road improvements
- Enhancement Program funded by Mass Highway
- Recreational Trails Program funded by Department of Conservation & Recreation (DCR)
- Greenways Program funded by DCR
- Congestion Management & Air Quality Funds (CMAQ)
- Community Preservation Act

Next Steps

MAPC Bicycle Planning -

- Check www.mapc.org/whats_new.html for project information, updates, and the opportunity to be involved
- Also:www.mapc.org/transportation/transportation_alternatives.html

Funding Opportunities -

- www.mapc.org/transportation/funding_opportunities.html

Send comments to: Bike_Plan@mapc.org

Benefits of Pedestrian and Bicycle Accommodations

- Recreation and fitness facilities for all ages and abilities
- Safe routes to schools
- Access to parks and recreation
- Link to the town center
- Asset to increase property values
- Enjoyment of natural areas
- Historic preservation